Abstracts

A W-Band Monolithic Downconverter

K.W. Chang, H. Wang, K.L. Tan, S.B. Bui, T.-H. Chen, G.S. Dow, J. Berenz, T.-N. Ton, D.C. Garske, T.S. Lin and L.C.T. Liu. "A W-Band Monolithic Downconverter." 1991 Transactions on Microwave Theory and Techniques 39.12 (Dec. 1991 [T-MTT] (1991 Symposium Issue)): 1972-1979.

This paper presents the design, fabrication, and evaluation of a fully integrated W-band monolithic down-converter based on InGaAs pseudomorphic (PM) HEMT technology. The monolithic downconverter consists of a two-stage low-noise amplifier and a single-balanced mixer. The single-balanced mixer has been designed using the HEMT gate Schottky diodes inherent to the process, Measured results of the complete downconverter show a conversion gain of 5.5 dB and a double-sideband (DSB) noise figure of 6.7 dB at 94 GHz. Also presented in this paper is the downconverter performance characterized over the 35°C to + 65°C temperature range. The downconverter design was a first pass success and has a high circuit yield. Furthermore, this is the first reported monolithic down-converter in the W-band frequency range, and represents the state-of-the-art in monolithic millimeter-wave technology.

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